



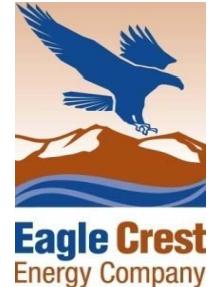
Eagle Crest
Energy Company

PANEL 2: Energy Storage Applications and Economics (Costs, Benefits and Revenue)

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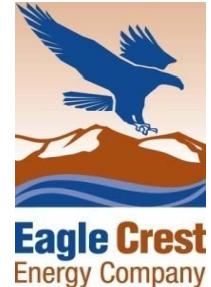
**2011 Integrated Energy Policy Report Committee Workshop on Energy
Storage for Renewable Integration
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Sacramento, California**

Eagle Crest Energy is:



- A 1300 MW closed-loop pumped storage facility being developed at an economically depleted iron mine that will provide utility-scale electricity storage to southern California designed to store in excess of 23,000 megawatt-hours
- Federal hydro license expected by end of year 2011
- Built with proven, commercially available technology
- Adjacent to a major southern California transmission corridor
- Ability to significantly reduce GHG emissions and enable additional variable generation to be developed in So Cal
- 500 construction jobs per year for four years and 50 permanent jobs during operations in eastern Riverside County

Costs of Utility-Scale, Grid Connected Energy Storage



- **Cost Estimates - \$1500 - \$3000/kw for large pumped hydro energy storage**
- **Energy storage should be built when it is a long-term least cost solution**
- **Often difficult to quantify the future value and forecast the amount needed of utility-scale storage, but flexibility of the existing pumped hydro storage fleet has allowed this resource to provide tremendous value historically**

Benefits of Utility-Scale, Grid Connected Energy Storage



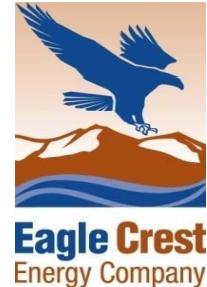
- Capacity
 - Swap value of peak/off-peak energy differential to provide customers lower cost energy
 - Ancillary services including comparable levels of incremental and decremental reserves
 - Transmission
 - Greenhouse gas reductions
 - Reduce renewable energy overgeneration (for example, off-peak wind during high-hydro periods)
 - Reduce frequent start/stops of gas peakers and improve overall efficiency of the gas fleet
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Revenue Sources for Utility-Scale, Grid Connected Energy Storage



- Large pumped hydro storage projects are long-lived assets – 50 plus years – need long-term agreements
- Due to the nature of electric markets in California and U.S. financial markets, unlikely that a non-utility owner would construct a facility without partnership or off-take agreements with IOUs or MOUs
- Revenue Sources
 - Utility ownership – rate-based asset
 - Contract storage agreements between load serving entities and independent owner/operators
 - Treatment of some or all of a storage project as an Advanced Transmission Asset and cost recovery through the TAC

Recommendations – AB 2514 Energy Storage Implementation for Utility-Scale, Grid Connected Energy Storage



- CPUC should determine utility-scale storage equivalent of MPR, which would include:
 - Capacity
 - Off peak/on peak swap value of energy
 - Ancillary services, including comparable levels of incremental and decremental reserves
 - Greenhouse Gas savings (using conservative assumptions)
 - Recognize many storage projects may also provide additional transmission system benefits, to be determined on a case-by-case basis according to an approved protocol
 - CPUC should recognize that utility-scale, grid connected storage to assist with variable energy generation integration requires contract terms of 20-25 years
 - In order to provide for variable energy integration and system reliability, “least regrets” targets for utility-scale, grid connected storage should be set for IOUs and MOUs in California
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THANK YOU

